

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 2 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

1. (Amended) A method for modulating the expression of an exogenous gene in an isolated cell containing:

- (i) a DNA construct comprising said exogenous gene under the control of a response element to which the modified ecdysone receptor of (ii) binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR); and
- (ii) a modified ecdysone receptor which, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;

said method comprising providing to the cell an effective amount of one or more ligands for said modified ecdysone receptor; wherein said one or more ligands are not normally present in the cell; and wherein said one or more ligands are not toxic to said cell.

sub
h1
F2
3. (Amended) A method according to claim 1 wherein said modified ecdysone receptor is further characterized as having substantially no constitutive activity in mammalian cells.

sub g2
4. (Amended) A method according to claim 1 wherein the DNA-binding domain of said modified ecdysone receptor is derived from a member of the steroid/thyroid hormone superfamily of receptors.

5. (Amended) A method according to claim 1 wherein said activation domain is obtained from a member of the steroid/thyroid hormone superfamily of receptors.

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 3 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

SUB
H1
F2
concl

6. (Amended) A method according to claim 1 wherein said activation domain is a glucocorticoid receptor activation domain, a VP16 activation domain or a GAL4 activation domain.

F3 93

11. (Amended) A method according to claim 1, wherein said receptor capable of acting as a silent partner is RXR.

SUB
H1
F4

19. (Amended) A method according to claim 1 wherein said exogenous gene is a wild type gene and/or gene of interest.

SUB
H1
F5
Sub 94

21. (Amended) A method according to claim 19 wherein said gene of interest encodes products:

which are toxic to the cells in which they are expressed; or

which impart a beneficial property to cells in which they are expressed.

22. (Amended) A method of inducing the expression of an exogenous gene in an isolated cell containing:

(i) a DNA construct comprising an exogenous gene under the control of a response element to which the modified ecdysone receptor encoded by the DNA of (ii) binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR);

(ii) DNA encoding a modified ecdysone receptor under the control of an inducible promoter, wherein said modified ecdysone receptor, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, and wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 4 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an *E. coli* LexA protein; and

(iii) one or more ligands for said modified ecdysone receptor;

said method comprising subjecting said cell to conditions suitable to induce expression of said modified ecdysone receptor.

23. (Amended) A method of inducing expression of an exogenous gene in an isolated cell containing a DNA construct containing said exogenous gene under the control of a response element to which a modified ecdysone receptor binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR), said method comprising introducing into said cell:

EB
94
a modified ecdysone receptor, wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an *E. coli* LexA protein; and

one or more ligands for said modified ecdysone receptor,

wherein said receptor, in combination with a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, activating transcription therefrom.

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 5 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

24. (Amended) A method for the expression of a recombinant product detrimental to isolated host cells, said method comprising:

transforming suitable isolated host cells with:

- E5*
cancel
94
cancel
- (i) a DNA construct encoding said recombinant product under the control of a response element to which the modified ecdysone receptor encoded by the DNA of (ii) binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR), and
 - (ii) DNA encoding a modified ecdysone receptor, wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;

growing said host cells in suitable media; and

inducing expression of said recombinant product by introducing into said host cells one or more ligands for said modified ecdysone receptor, and optionally a receptor capable of acting as a silent partner for said modified ecdysone receptor.

50. (Amended) A method for modulating the expression of an exogenous gene in an isolated cell containing:

- #6*
95
- (i) a DNA construct comprising said exogenous gene under the control of an ecdysone response element; and
 - (ii) a modified receptor which, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 6 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;

said method comprising providing to the cell an effective amount of one or more ligands for said modified receptor; wherein said one or more ligands are not normally present in the cell; and wherein said one or more ligands are not toxic to said cell.

51. (Amended) A method according to claim 50, wherein said receptor capable of acting as a silent partner is present.

52. (Amended) A method according to claim 51, wherein said receptor capable of acting as a silent partner is ultraspiracle.

54. (Amended) A method according to claim 51, wherein said receptor capable of acting as a silent partner is RXR.

55. (Amended) A method according to claim 54, wherein said RXR is exogenous to said cell.

57. (Amended) A method according to claim 50 wherein said modified receptor is further characterized as having substantially no activity in mammalian cells.

58. (Amended) A method according to claim 50 wherein the DNA-binding domain of said modified receptor is derived from a member of the steroid/thyroid hormone superfamily of receptors.

59. (Amended) A method according to claim 50 wherein said activation domain is derived from a member of the steroid/thyroid hormone superfamily of receptors.

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 7 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

Sub
E8
h1
60. (Amended) A method according to claim 50 wherein said activation domain is a glucocorticoid receptor activation domain, a VP16 activation domain or a GAL4 activation domain.

E9
h1
Sub
64. (Amended) A method according to claim 50 wherein said exogenous gene is a wild type gene and/or gene of interest.

Sub
h1
E10
66. (Amended) A method according to claim 64 wherein said gene of interest encodes products:

which are toxic to the cells in which they are expressed; or
which impart a beneficial property to cells in which they are expressed.

Sub
h1
E10
Sub 99
67. (Amended) A method of inducing the expression of an exogenous gene in an isolated cell containing:

- (i) a DNA construct comprising an exogenous gene under the control of an ecdysone response element,
- (ii) DNA encoding a modified receptor under the control of an inducible promoter, wherein said modified receptor, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;
- (iii) one or more ligands for said modified receptor;

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 8 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

said method comprising subjecting said cell to conditions suitable to induce expression of said modified receptor.

68. (Amended) A method of inducing expression of an exogenous gene in an isolated cell containing a DNA construct containing said exogenous gene under the control of an ecdysone response element, said method comprising introducing into said cell:

a modified receptor, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein; and

one or more ligands for said modified receptor,

wherein said modified receptor, in combination with a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element, activating transcription therefrom.

69. (Amended) A method for the expression of a recombinant product detrimental to isolated host cells, said method comprising:

transforming suitable isolated host cells with:

(i) a DNA construct encoding said recombinant product under the control of an ecdysone response element, and

(ii) DNA encoding a modified receptor, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 9 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein; and
growing said host cells in suitable media; and
inducing expression of said recombinant product by introducing into said host cells one or more ligands for said modified receptor, and optionally a receptor capable of acting as a silent partner for said modified receptor.

70. (Amended) A method for modulating the expression of an exogenous gene in an isolated cell containing:

- 59
710
- (i) a DNA construct comprising said exogenous gene under the control of an ecdysone response element; and
 - (ii) a modified receptor which, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element wherein said modified receptor has substantially no constitutive activity in mammalian cells, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;

said method comprising providing to the cell an effective amount of one or more ligands for said modified receptor, wherein said one or more ligands are not normally present in the cell; and wherein said one or more ligands are not toxic to said cell.

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 10 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

71. (Amended) A method for modulating the expression of an exogenous gene in an isolated cell containing:

- 99
F10
- (i) a DNA construct comprising said exogenous gene under the control of an ecdysone response element; and
 - (ii) a modified ecdysone receptor which, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element, wherein said modified receptor has an altered DNA binding specificity relative to the wildtype receptor from which it is derived, and wherein said modified ecdysone receptor comprises:
 - (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;

said method comprising providing to the cell an effective amount of one or more ligands for said modified ecdysone receptor; wherein said one or more ligands are not normally present in the cell; and wherein said one or more ligands are not toxic to said cell.

72. (Amended) A method for modulating the expression of an exogenous gene in a mammalian subject containing:

- (i) a DNA construct comprising said exogenous gene under the control of a response element to which the modified ecdysone receptor of (ii) binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR); and
- (ii) a modified ecdysone receptor which, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, and wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 11 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an *E. coli* LexA protein;

410
said method comprising providing to said subject an effective amount of one or more ligands for said modified ecdysone receptor; wherein said one or more ligands are not normally present in said subject; and wherein said one or more ligands are not toxic to said subject.

99
73. (Amended) A method of inducing the expression of an exogenous gene in a mammalian subject containing:

- (i) a DNA construct comprising an exogenous gene under the control of a response element to which the modified ecdysone receptor encoded by the DNA of (ii) binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR);
- (ii) DNA encoding a modified ecdysone receptor under the control of an inducible promoter, wherein said modified ecdysone receptor, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, and wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an *E. coli* LexA protein; and
- (iii) one or more ligands for said modified ecdysone receptor;

said method comprising subjecting said subject to conditions suitable to induce expression of said modified ecdysone receptor.

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 12 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

74. (Amended) A method of inducing expression of an exogenous gene in a mammalian subject containing a DNA construct containing said exogenous gene under the control of a response element to which the modified ecdysone receptor described below binds, wherein said response element has substantially no binding affinity for farnesoid X receptor (FXR), said method comprising introducing into said subject:

4 F10
99 cont
a modified ecdysone receptor, wherein said modified ecdysone receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid, (b) a DNA-binding domain obtained from a DNA-binding protein; and (c) an activation domain of a transcription factor, wherein at least one of said DNA-binding domain or said activation domain is not obtained from a native ecdysone receptor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein; and

one or more ligands for said modified ecdysone receptor,

wherein said modified ecdysone receptor, in combination with a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, activating transcription therefrom.

75. (Amended) A method for modulating the expression of an exogenous gene in a mammalian subject containing:

- (i) a DNA construct comprising said exogenous gene under the control of an ecdysone response element; and
- (ii) a modified receptor which, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said response element, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 13 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;

said method comprising providing to said subject an effective amount of one or more ligands for said modified receptor; wherein said one or more ligands are not normally present in said subject; and wherein said one or more ligands are not toxic to said subject.

76. (Amended) A method of inducing the expression of an exogenous gene in a mammalian subject containing:

- FIG 9 cont*
- (i) a DNA construct comprising an exogenous gene under the control of an ecdysone response element,
 - (ii) DNA encoding a modified receptor under the control of an inducible promoter, wherein said modified receptor, in the presence of a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an E. coli LexA protein;
 - (iii) one or more ligands for said modified receptor;

said method comprising subjecting said subject to conditions suitable to induce expression of said modified receptor.

In re Application of: Evans et al.
Application No.: 09/042,488
Filing Date: March 16, 1998
Page 14 of 52

PATENT
Attorney Docket No.: SALK1520-2
(088802-8752)

77. (Amended) A method of inducing expression of an exogenous gene in a mammalian subject containing a DNA construct containing said exogenous gene under the control of an ecdysone response element, said method comprising introducing into said subject:

a modified receptor, wherein said modified receptor has substantially no binding affinity for endogenous response elements, and wherein said modified receptor comprises: (a) a ligand binding domain capable of binding an ecdysteroid; (b) a DNA-binding domain derived from a DNA-binding protein, wherein said DNA-binding domain has substantially no binding affinity for endogenous response elements; and (c) an activation domain of a transcription factor, with the proviso that when said activation domain is derived from a glucocorticoid receptor, said DNA-binding domain is not derived from a glucocorticoid receptor or an *E. coli* LexA protein; and

one or more ligands for said modified receptor,

wherein said modified receptor, in connection with a ligand therefor, and optionally in the further presence of a receptor capable of acting as a silent partner therefor, binds to said ecdysone response element, activating transcription therefrom.

Please cancel claims 2 and 56 without prejudice.